

**What is claimed is:**

1. A method using fluorescence microscopy for image evaluation, the method comprising the steps of:

using a laser scanning microscope in which an at least partially spectrally resolved detection of the fluorescence spectrum occurs;

using reference spectra for spectral demixing;

employing temporally and/or spectrally variable dyes and/or dye combinations for recording of the reference spectra; and

demixing the recorded reference spectra for image evaluation.

2. The method according to claim 1 wherein the method records organic processes.

3. The method according to claim 1 wherein the method records intracellular processes.

4. The method according to claim 2 wherein the method records intercellular processes.

5. The method according to claim 1 wherein the method records cells and/or cell populations.

5. The method according to one claim 1 in which recording of reference spectra of photoconvertible dyes occurs.

7. The method according to one claim 1 in which recording of reference spectra of photoactivatable dyes occurs.

8. The method according to claims 1 in which recording of reference spectra of indicator dyes occurs.

9. The method according to claim 1 in which recording of reference spectra of dyes occurs that change their spectra dynamically based on intracellular processes.

10. The method according to one claim 1 in which recording of reference spectra of dyes occurs with a different rise in fluorescence intensity.

11. The method according to claims 1 in which recording of reference spectra of the fluorescing protein Kaede occurs.

12. The method according to one claims 1 in which recording of reference spectra of PA-GFP occurs.